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Email Improvements: Gain Five Percent Labor Hours with Better Communication

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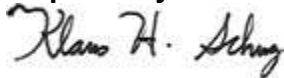
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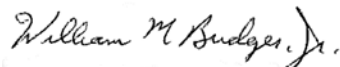
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CONTENTS

	<u>Page</u>
1.0 SUMMARY.....	6
2.0 BACKGROUND	6
3.0 Problem AND Need Description	7
4.0 TECHNOLOGY Overview	9
4.1 Issuing Memos Of “Top 10 E-Mail Tips” And Guidelines	9
4.2 Apply Quotas To The E-Mail Messages	10
4.3 Scheduling Quiet Time	10
4.4 Zero-Email Day	10
4.5 Technology To Help Prevent Interrupting People At The Wrong Time	10
4.6 Just-In-Time Coaching	10
4.7 Automate Messages Classification And Handling Of The In-Box Of Individual Users	11
4.8 Comprehensive Employee Training And Maintenance Program.....	12
5.0 TECHNOLOGY ANALYSIS	12
5.1 Issuing Memos Of “Top 10 E-Mail Tips” And Guidelines	12
5.2 Apply Quotas To The E-Mail Messages	13
5.3 Scheduling Quiet Time	13
5.4 Zero-Email Day	13
5.5 Technology To Help Prevent Interrupting People At The Wrong Time	14
5.6 Just-In-Time Coaching	14
5.7 Automate Messages Classification And Handling Of The In-Box Of Individual Users	14
5.8 Comprehensive Employee Training And Maintenance Program.....	14
6.0 CONCLUSION	15
7.0 REFERENCES.....	15

FIGURES

Figure

- 1 Tools to help individual users better manage their e-mail are entering the market. One such tool is ClearContext Professional [above] from ClearContext Corp., which automatically sorts messages by importance and includes tools to let you easily consolidate e-mail by project..... 11
- 2 Analyze ClearContext Professional also includes e-mail analysis tools [above] and, just for fun, lets you compare your e-mail behavior with that of other users. It doesn't, however, answer the question of whether getting a speedy average response time is good or bad. 12

1.0 SUMMARY

A number of methods and software tools are examined that are proven to reduce the amount of time spent on email by an average of two hours per week per person, while at the same time increasing communications effectiveness. Improvement to Arnold Engineering Development Center (AEDC) Email communications would provide a five percent increase in available AEDC engineering labor hours. If used for augmenting life cycle systems engineering steps, such as improved requirements definition and analysis of alternatives, the freed up engineering hours would significantly reduce the cost of ground testing.

Freeing up engineering hours is required for design and implementation of enterprise vs. organization or location specific solutions. The AEDC Strategic Information Technology (IT) Plan calls for lower life cycle cost, more flexible, and a smaller amount and variety of test and test support hardware, software, and processes. In the environment of decreasing IT budgets, one of the only methods of sustaining a current level of services is designing and implementing shared functionality/services- vs. organization or location specific (non shared) solutions. Service Oriented Architecture (SOA) is the current terminology and paradigm for implementing the time proven concept of maximum efficiency – resource sharing. Additional requirements analysis and design are required to move from currently scoped and budgeted “stove-pipe”, non shared capability sustainment and implementation to enterprise wide solutions. Building enterprise wide solutions requires definition of the set of shared functions and their interfaces, the sets of functions to be bundled as services and their interfaces, the set of services to be bundled to build capabilities and their interfaces, the set of unique functions and their interfaces for each test mission capability, and the physical interconnectivity specifics – locations, hardware hosts, networks and communication protocols. Add Information Assurance (IA) and Industrial Security (IS) requirements, and one can see the need for additional engineering hours for shared, enterprise wide solutions over the typical “stove-pipe” capability implementation.

With reduced funding, it becomes more difficult to free up labor hours to invest in a plan that leads to a better future state. A five percent increase in engineering hours, if used to fund the labor portion of the AEDC Strategic IT Plan, would significantly improve the ability to execute the plan, significantly improving the likelihood of achieving the better future state – lower life cycle cost, more flexibility and smaller amounts/variety of components.

2.0 BACKGROUND

This report documents the research and analysis of available and applicable technologies that could be used to achieve the Arnold Air Force Base (AFB) Arnold Engineering Development Center (AEDC) Enterprise Information Technology (IT) Strategic Plan ([\\arnold-2k\aedc\IT Strategic Plac](#)).

The AEDC Test, Communications and Business Enterprise IT Strategic Plan has three main objectives for AEDC’s systems and components:

- lower life cycle cost
- increase agility/flexibility
- decrease the footprint (quantity and variety).

At AEDC, IT encompasses any equipment or interconnected system or subsystem of equipment that is used in the automatic acquisition, storage, manipulation, management, movement, control, display, switching, interchange, transmission, or reception of data or information.

- All test and non-test software and firmware, including the computers, ancillary equipment, related procedures, services, and resources required to execute and maintain the software and firmware.
- All test system and related infrastructure used in acquiring, processing, and storing test data. To preserve data quality, this includes all equipment within an unbroken measurement chain such as measurement sensors, data acquisition system, calibration support equipment that provides traceability to the National Institute of Science and Technology (NIST), and all software used to measure, convert, transmit, store, and report test phenomenon.
- All plant and test article control systems used to (1) establish and regulate test conditions, (2) establish and regulate test article controls such as throttle and model position, and (3) control sequence of test events. This includes actuators, feedback elements, programmable logic controllers (PLC), computers, sequencers, software and associated infrastructure.

IT includes coordination and integration of all instrumentation, data acquisition, data analysis, data distribution, test control and test related hardware, software and processes. The definition of IT at Arnold AFB encompasses all ground testing facilities computer, communication, control, data acquisition, data analysis systems, instrumentation, hardware and software, all personal computing and communications components, as well as the typical components of business systems such as Work Order Management, Human Resources and Payroll transaction systems. The organization in charge of IT is named IT & Systems (IT&S) to acknowledge the fact that the scope of IT at Arnold AFB is magnitudes larger than what is typically thought of as IT. Without IT, testing and the test mission of Arnold AFB's AEDC cannot be performed.

Since the scope, and therefore the impact, of IT is almost all encompassing at Arnold AFB, an IT Strategic Plan is a necessity to sustain testing capabilities with budget and resource fluctuations.

The research and the scope of that research to be performed each month is a compilation of inputs from all Information Technology & Systems (IT&S) Directorate Branches, the IT&S Chief Architect, Test (TE) Directorate Technology & Analysis (TE50), Facilities Operations & Maintenance (FA), the AEDC 649th Test Systems Squadron (TESS) Small Business Innovative Research Program (SBIR) office, the 704th Communications Squadron (CS) and the 740th CS Deputy Director or Chief Architect. All inputs are consolidated, prioritized, scoped and tasking defined by the IT&S and 704th CS Chief Architects. Contactor (ATA) tasking is then assigned by the IT&S Chief Architect and Deputy Director as resource availability and work priorities allow. Reporting periods and report generation are planned as monthly, but reports may cover several months depending upon activity levels.

3.0 PROBLEM AND NEED DESCRIPTION

Information, the very thing that makes it possible to be an engineer, a doctor, a lawyer, or any other kind of modern information worker, is threatening our ability to do our work. Unrestrained, the volume of data is drowning us. The amount of time spent sorting through data and to extract applicable information is reducing productivity and creativity. The time that workers at AEDC invest in coping with this overload is significant. At Intel Corporation the loss due to unnecessary e-mails and unproductive interruptions was assessed at 8 hours a week per person. In a 1996 Reuters survey of 1300 managers worldwide, two out of three respondents associated information overload with loss of job satisfaction and tension with colleagues, and 42

percent attributed ill health to this stress. Today, more than 10 years later, the numbers are likely to be even higher [1].

Information overload is a combination of two elements: queued messaging overload and interruptions or distractions. Queued messaging overload can happen anywhere you have a queue of incoming messages, most notably your e-mail in-box. Some of the messages are critical, most are not, but they all accumulate until dealt with. Workers typically receive 50 to 200 work related e-mails daily. Surveys show that people spend some 20 hours a week processing work-related e-mail messages, of which about a third are unnecessary. Processing this third wastes about 2 hours a week.

Interruptions and distractions take many forms. They include ringing phones, text messages, instant messages, the chime that alerts you to incoming e-mail, and, of course, a colleague dropping by your office to chat. Any of these can break the chain of thought and cause the current task to be dropped. There is a myth that this is okay because people can multitask, but ample research proves that the brain simply doesn't work that way. Even when the interrupting task is related to work, time is wasted as the brain switches from one task to another and back again. Field research by Gloria Mark and her colleagues at the University of California, Irvine, shows that information workers are interrupted on average every 3 minutes. Even if it takes the brain only a minute to get back in gear, that's a lot of wasted time. Constant distractions also make us stupid. Research clearly demonstrates that interruptions degrade accuracy, judgment, creativity, and effective management. The psychiatrist Edward Hallowell coined the phrase "attention deficit trait" to describe this phenomenon and found that it makes people perform far below their full potential. Creative thinking, essential to many engineering jobs, requires long stretches of uninterrupted time. Programmers are known for working odd hours, when they can have the quiet they need to concentrate. Other professionals find that their best thinking takes place on airplanes and in hotels during business trips, when they're somewhat disconnected. But even this time is shrinking fast as remote access becomes ubiquitous. At one company, researchers found that recipients read 70 percent of e-mails within 6 seconds of arrival. In the battle between creative thought and distractions, creativity is losing.

William Shockley knew the value of isolation. In 1948, shortly after his colleagues John Bardeen and Walter Brattain invented the point-contact transistor in Shockley's absence, he became so upset that he isolated himself in a hotel room to think quietly without distractions. Some days later he emerged, having worked out the basic design for the far superior junction transistor that became the key to modern electronics. Today few can afford the luxury of such isolation. While most agree that electronic messaging is critical to modern business and that some interruptions are vital to workplace interactions, clearly they've become too much of a good thing. This glut affects Fortune 500 corporations, tiny companies, schools, government agencies, churches, and nonprofits. This includes AEDC.

The irony of this constant communication is that people are not communicating as well. Consider the meeting where everyone's eyes are glued to their Blackberries or laptops. People are sifting through e-mail or scanning reports or updating spreadsheets. Few are paying attention to the business at hand. Long ago, typical response times to e-mail was next-day. Today, many employees respond more slowly or not at all. In the process, they may delay progress on key projects. Catherine Cramton, an associate professor in the School of Management at George Mason University, in Fairfax, Va., identified e-mail silence as one of the biggest challenges facing geographically dispersed teams.[1] Let's say Jack fails to answer Jill's e-mail asking him to weigh in on an important question. She may misinterpret his silence as

indifference, when in fact he may be too swamped or distracted to fashion a coherent response. Misunderstandings like that can hamper a team's performance. The very paradigm of work planning has changed. Where people used to be plan driven, having a plan and spending the time executing it, people are now "interrupt driven." People respond, sometimes on the spot, to any request for action. This unplanned shift of priorities can derail progress on the primary job. At this point, every organization recognizes that information overload is a problem, and a small but growing fraction of organizations are actually doing something about it.

Processing messages, whether unnecessary or not, is a source of distraction. Emails therefore compose both elements of information overload. As a result, this paper concentrates on improvements to emails as a means of combating both sources of information overload. Academic researchers have been studying the problem for years, and now organizations are beginning to take action to mitigate this problem. Some are deploying training and behavioral change programs, trying their hands at setting up quotas and encouraging alternatives to e-mail, and experimenting with interruption-free "quiet time" blocks. This paper specifically focuses on how to eliminate the third of unnecessary messages and thereby freeing up 2 hours a week per worker for a 5% gain in productive labor hours.

4.0 TECHNOLOGY OVERVIEW

There are a number of methods, technologies and combinations of both that have been and can be applied to reduce the amount of time spent on email while improving communications among work force members. The solutions run from the simple to the complex. Intel has been trying different approaches to the problem since 1995. They have remedies that improve efficiency and understand limitations of other approaches. The following list of procedural and technological approaches includes real-world application experiences of Intel and other companies. Each approach is described and then evaluated in Section 5.

- 1) Issuing Memos of "Top 10 E-Mail Tips" and Guidelines
- 2) Apply Quotas to the E-Mail Messages
- 3) Scheduling Quiet Time
- 4) Zero-Email Day
- 5) Technology to Help Prevent Interrupting People at the Wrong Time.
- 6) Just-In-Time Coaching
- 7) Automate Messages Classification and Handling of the In-Box of Individual Users
- 8) Comprehensive Employee Training and Maintenance Program

4.2 ISSUING MEMOS OF "TOP 10 E-MAIL TIPS" AND GUIDELINES

At the simple end of the solutions via application of technology and methods are guidelines on e-mail management that employees are encouraged, but not required, to adopt. At first glance the causes of and fixes for information overload would seem obvious: People send too many messages and therefore people need to send fewer. People write long messages where shorter ones would do, or hit "Reply All" where one recipient would suffice. Such bad habits lead many organizations to think the problem can be resolved simply by issuing memos of "Top 10 E-mail Tips" advising people how to be more efficient.

4.3 APPLY QUOTAS TO THE E-MAIL MESSAGES

In recent years companies have experimented with more radical solutions. One approach is applying quotas to the e-mail messages a worker can send. The manager of one British company went so far as to ban e-mail altogether for internal messaging. Others have merely limited the number of messages a person may send in a day. There are automated, software based, methods for setting email quotas such as Attent, from Seriosity Corp. There are also manual methods of quota tracking and adherence.

4.4 SCHEDULING QUIET TIME

What about shielding employees from interruption? Many engineers secure thinking time on their own by working odd hours (say, coming in at 6 a.m.). A more structured approach is scheduling quiet time. During certain hours of the day, employees neither send or respond to emails. In the case of emergency communications, emails are not allowed but voice or personal communication is mandated.

4.5 ZERO-EMAIL DAY

Companies can also institute what has come to be called a Zero E-mail Day. The idea isn't to ban e-mail on a given day. It's an attempt to break the e-mail addiction by getting everyone in a work group to agree to collaborate on the chosen day, by walking across the aisle, talking to coworkers, and solving problems in real time, rather than shooting an e-mail to someone just two cubicles away.

4.6 4.5 TECHNOLOGY TO HELP PREVENT INTERRUPTING PEOPLE AT THE WRONG TIME

The use of technology to help prevent interrupting people at the wrong time is another option. Development along these lines is happening in various software vendor groups. Microsoft Research has prototyped a tool called Priorities, which analyzes incoming messages to predict their criticality, examines the recipient's current activity, and takes action accordingly. A message deemed to be urgent from a sender and/or known to be important to the recipient may trigger an immediate alert or be forwarded to the recipient's mobile device, while delivery of a less urgent message may be deferred.

4.7 JUST-IN-TIME COACHING

Another automated approach is just-in-time coaching. Clearly, many breaches of e-mail etiquette are the result of simple oversight: hitting Reply All instead of Reply, forgetting to attach a file, or leaving the subject line blank. These situations are easily detectable by software, such as the E-mail Effectiveness Coach, a homegrown tool Intel used in the early 2000's. This ran in the background, and whenever the user clicked Send, it checked the message for etiquette problems. If a problem was found, a friendly alert popped up to give the user the opportunity to correct it. For example, when a user composed a message referring to attachments and the tool noticed that no files were attached, the alert would say, "Did you notice your message contains a reference to an attachment, but there are no attached files?" and then provides the option to abort the Send operation and for corrections to the problem.

4.8 AUTOMATE MESSAGES CLASSIFICATION AND HANDLING OF THE IN-BOX OF INDIVIDUAL USERS

There is a growing body of products that automate the classification and handling of messages in the in-box of the individual user. A good example is ClearContext Professional, from San Francisco-based ClearContext Corp., depicted in Figures 1 and 2. The approach is to analyze a user's e-mail history and identify the important messages and correspondents; to provide in-box views to sort and color-code messages by importance, topic, and so forth; and to place messages, contacts, meetings, and tasks into one contextual framework where all things related to a given project are presented and managed together. No one tool is best for everyone, but there is enough choice that anyone can find a tool that matches his or her work style.

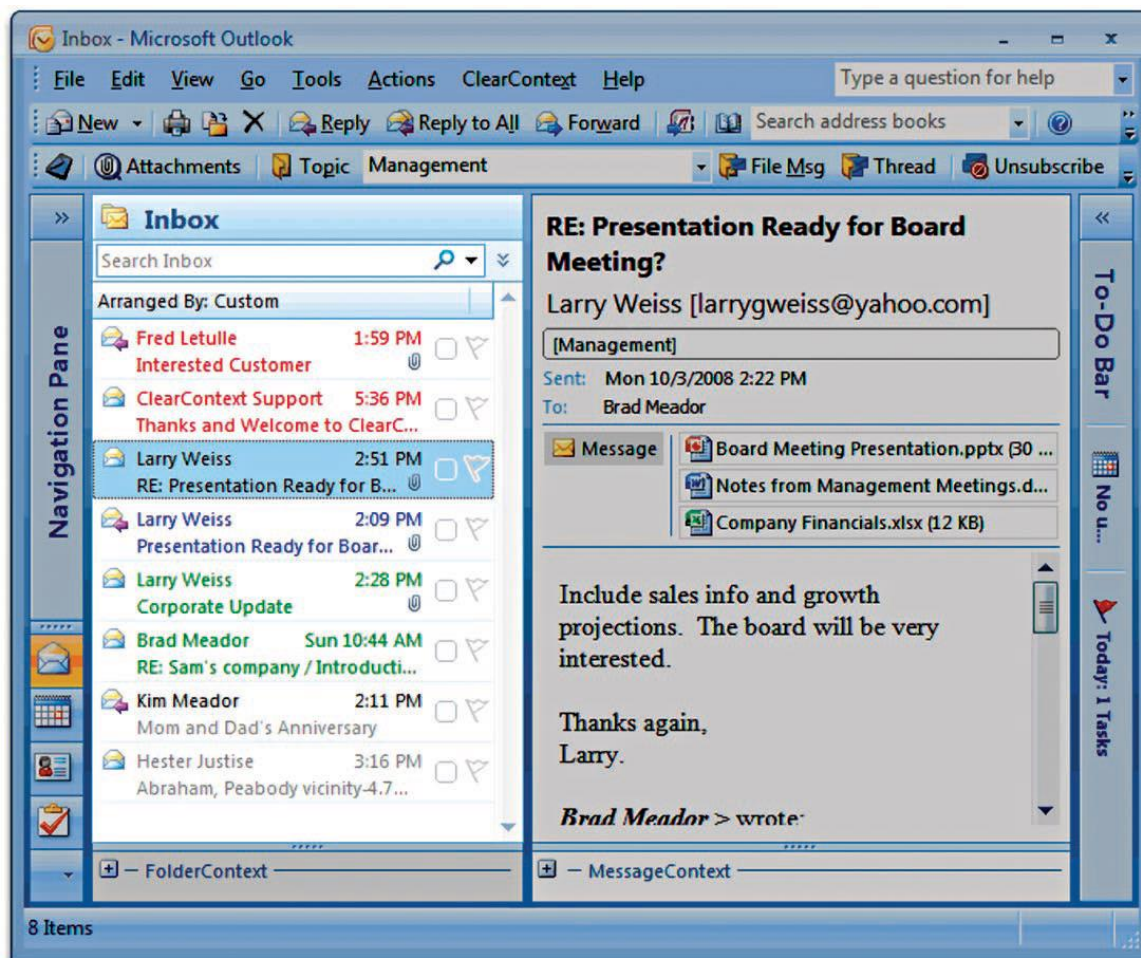


Figure 1. Tools to help individual users better manage their e-mail are entering the market. ClearContext Professional from ClearContext Corp. automatically sorts messages by importance and includes tools to consolidate e-mail by project.



Figure 2. Analyze in ClearContext Professional includes e-mail analysis tools to compare e-mail behavior with that of other users.

4.9 COMPREHENSIVE EMPLOYEE TRAINING AND MAINTENANCE PROGRAM

At the other end of the scale of solutions via application of technology and methods is a comprehensive employee training program based on a waterfall model. The top management level is exposed to the required training and thinking. The program training and then moves down level by level, with each manager at each level training his or her staff, who then trained their own staffs, and so on, all the way to the bottom of the hierarchy. At each level people received awareness training, held a team discussion to identify changes in the context of their own work, and took skill coaching that made them more proficient in the effective use of e-mail. The program sought to teach individuals the skills required for faster in-box processing while helping teams to define “group contracts”—mutually agreed-upon behaviors and expectations that would reduce the misuse and abuse of e-mail.

5.0 TECHNOLOGY ANALYSIS

4.10 ISSUING MEMOS OF “TOP 10 E-MAIL TIPS” AND GUIDELINES

Senders of superfluous e-mail know full well that it will be deleted. They do the same thing when they are the recipients. Why, then, send it? The reasons are found in organizational culture. People may hit Reply All because they think sending a message at midnight will impress the boss, or they may be trying to cover themselves and create a paper trail in an organization where mistrust is a factor. Everyone would prefer that there be fewer messages, but nobody can afford to be the first to cut back on sending them. Unfortunately, organizational culture evolves much more slowly than technology does. New information channels appear and are adopted with little attention to the behavioral outcomes. When a new device makes it possible, for instance, to communicate with workers who are on vacation, nobody stops to question whether applying this capability might contribute to employee burnout.

In 2007, Intel’s worldwide IT group circulated a carefully chosen email guideline to its employees every few weeks (for example, “Make a long story short—add a management summary to lengthy messages”). The company offered prizes for employees’ own improvement ideas. The program indeed increased awareness, improved behavior, and reduced the reported time for email processing, and -has been adopted by additional groups in the company.

Another example is found in <http://iorgforum.org/articles/AltmanMay09Article.pdf> called **Tiny Soapbox**. Each tiny soapbox has three key characteristics: It conveys a concrete idea, it provides evidence to support that idea, and it does all this in few words. By requiring a certain amount of rigor in the presentation, Tiny Soapbox reduces information overload by filtering out unsubstantiated ideas.

Although guidelines don't remove the problem's root causes, they are easy to implement and often do have a positive impact. Issuing of Memos and Email Guidelines is already implemented to some degree at Arnold.

4.11 APPLY QUOTAS TO THE E-MAIL MESSAGES

One of the most sophisticated systems for influencing email usage is Attent, from Seriosity, based in Palo Alto, Calif. It works by charging "postage" to send an email, paid in a virtual currency denominated in "serios." The more urgent your e-mail, the more serios you attach to it; the recipients can then reuse the serios to send their own messages. Research into such systems is ongoing, and the opportunities for refinement include varying the postage according to parameters like the number of recipients, the recipient's organizational role (a senior manager might charge more postage for his or her attention), and the length of the message. An automated method of limiting emails is rather inexpensive to implement and is effective, but requires a maintenance and licensing cost. Manual methods, unless measured, rewarded (positively for adherence and negatively for non-adherence) suffer from the same organizational culture drawbacks as the previously examined approach of Issuing Memos and Guidelines.

4.12 SCHEDULING QUIET TIME

In 2007 and 2008 Intel conducted a pilot of this methodology, albeit for only one morning per week, with a team of 300 design engineers and their managers. Results were encouraging: In surveys, 45 percent of respondents said they found the methodology effective as it was, and 71 percent recommended that Intel extend it to other groups, possibly with some modifications. People applied the quiet hours in different ways. People had expected that the quiet hours would be most useful for the designers, but even people in support roles benefited from having one morning a week when they could catch their breath, plan, and deal with the accumulation of tasks that were not related to their primary roles. Following the pilot, the company has implemented the approach with other groups.

A Quiet Time experiment is described in detail by Leslie Perlow, a professor at Harvard Business School, in her book *Finding Time* (Cornell University Press, 1997). At a Fortune 500 company that manufactures computing hardware, she blocked out three mornings a week for the engineers in a design team to work without interruption, posting signs during the quiet periods to remind them of this commitment. She reported that the policy led to faster completion of the design project as well as a less harassing work environment.

4.13 ZERO-EMAIL DAY

The most successful Zero E-mail Day program was undertaken at PBD Worldwide Fulfillment Services, a company in Alpharetta, Ga., whose business involves warehousing products and filling orders. In this case, the CEO made it clear that he was passionate about the project. The results included enthusiastic employees, delighted customers, and a significant reduction in e-mail volume during the rest of the week. A key ingredient is support and enforcing of the top

level management of the Zero E-mail Day program. This is a low cost, low technology approach, but has been proven quite effective in a warehousing environment.

4.14 TECHNOLOGY TO HELP PREVENT INTERRUPTING PEOPLE AT THE WRONG TIME

The use of software technology to help prevent interrupting people at the wrong time is an option. Microsoft Research's prototype tool, Priorities, analyzes incoming messages to predict their criticality, examines the recipient's current activity, and takes action accordingly. A message deemed to be urgent from a sender and/or known to be important to the recipient may trigger an immediate alert or be forwarded to the recipient's mobile device, while delivery of a less urgent message may be deferred. Other similar tools are available but require some extensive rule definitions which are difficult to define or unlikely to work for all email users. The major drawback with this approach is getting such software approved for use on the NIPRNet connected user machines or email servers. Approval is a lengthy process. License fees and maintenance are also an ongoing operations & maintenance (O&M) costs of such an approach. The fact that this is an automated approach and therefore constantly exercised is the main positive aspect of this approach. This software can be used to automate the first four approaches.

4.15 JUST-IN-TIME COACHING

Just-in-time coaching is another automated approach. Breaches of e-mail etiquette are often the result of simple oversight: hitting Reply All instead of Reply, forgetting to attach a file, or leaving the subject line blank. These situations are easily detectable by software. Indeed, some of this functionality is available in email programs or email program plug-ins. Finding items to look for are not easily defined beyond a few basic rules such as assuring that an attachment is attached if referred to in the body of the email. Simple and automated are the advantages. Small scope and software approval are the drawbacks.

4.16 AUTOMATE MESSAGES CLASSIFICATION AND HANDLING OF THE IN-BOX OF INDIVIDUAL USERS

Automating the classification and handling of messages in the user's in-box via software such as ClearContext Professional, can save on interruptions and on time to process emails. This approach is not aimed at reducing the number of emails but is complementary to email reduction approaches. No one tool is best for everyone, but there is enough choice that anyone can find a tool that matches his or her work style. The major drawback with this approach is getting such software approved for use on the NIPRNet connected user machines or email servers. License and maintenance O&M costs are a drawback. The time savings are hard to measure. If combined with an electronic file system standard and used to automate an existing directive, legal or contractual requirement, then this software has a positive Return on Investment (ROI) and a positive business case analysis.

4.17 COMPREHENSIVE EMPLOYEE TRAINING AND MAINTENANCE PROGRAM

Intel Corporation deployed such a program, called YourTime, across most of Intel in 2000. This program was quite successful—for a while. The problem with such training drives is that they are inevitably forgotten in a year or two. To maintain the impact, the organization must reinforce the training periodically. The trainings are relatively inexpensive to implement, but it does take some effort and time.

6.0 CONCLUSION

Issuing of Memos and Email Guidelines is already implemented to some degree at Arnold, with little success. More effort on this approach is not recommended. The following manual, policy and training based approaches are recommended to be implemented at AEDC:

- 1) Scheduling Quiet Time
- 2) Zero-Email Day

The following automated, software based approaches are recommended to be implemented at AEDC:

- 1) Apply Quotas to the E-Mail Messages
- 2) Just-In-Time Coaching

Automated Messages Classification and Handling of the In-Box of Individual Users is recommended only if it can be used to implement a required or DoD, AF standard mandated electronic record management organization or file system requirements.

While many personal tools exist, it's surprising how little has been done at an organization-wide level to fight a problem as big as information overload, considering that the cost of addressing the time drain seems small compared to the potential benefit. More optimum balance of communication and thinking time, human interaction and concentration, useful messages and junk is proven to exist and achievable using the techniques and technologies examined. Convincing individuals and organizations to actually do something is not easy, but a slowly growing number of cases show that people can manage information with good results. An average of two hours per week per person has been the experience of companies who have applied these techniques and technologies.

What is most needed is support and enforcement by AEDC top level management, the commander and two-letter chiefs, of whatever guidelines, automated tools or combination thereof for an email reduction program, particularly the non-software tool, guideline, policy and self policing approaches. Ways to mitigate information overload is beneficial for every member of an organization and therefore even more beneficial for the organization as a whole.

With reduced funding, it becomes more difficult to free up additional labor hours to make the investment in a plan that leads to a better future state. According to statistics compiled by other companies, a five percent increase in engineering hours should be available, at no additional cost, with email reduction techniques "saved" labor hours. This would significantly improve the ability to execute a plan to achieve an AEDC future state of IT and test operations of lower life cycle cost, more flexibility and smaller amounts/variety of components.

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